



0000159836

RECEIVED

TEP

2015 FEB -2 P 1:04

Tucson Electric Power
88 East Broadway Blvd., P.O. Box 711, RP COMMISSION
Tucson, AZ 85702 DOCKET CONTROL

January 29, 2015

Docket Control
Arizona Corporation Commission
1200 West Washington Street
Phoenix, AZ 85007

ORIGINAL

Re: Notice of Filing – Tucson Electric Power Company's 2015-2024 Ten-Year Plan
Docket No. E-00000D-15-0001

Pursuant to A.R.S § 40-360.02, enclosed for filing is an original and thirteen copies of
Tucson Electric Power Company's ("TEP") 2015-2024 Ten-Year Plan.

If you have any questions, please contact me at (520) 884-3680.

Sincerely,

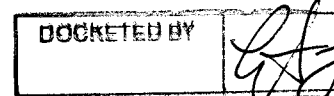
Melissa Morales

Arizona Corporation Commission

DOCKETED

cc: Compliance Section, ACC

FEB 02 2015





Tucson Electric Power

TEN-YEAR PLAN FOR YEARS 2015-2024

**SUBMITTED TO THE
ARIZONA CORPORATION COMMISSION
JANUARY 2015**

DOCKET NO: E-xxxxxxx-xx-xxxx

CONTENTS

INTRODUCTION	4
Load Forecasting	4
Effects of Distributed Renewable Generation and Energy Efficiency Programs.....	4
<i>Extra High Voltage Transmission System</i>	4
EHV Project Categories.....	5
<i>Planning the Local High Voltage (138kV) Transmission System</i>	5
138kV (HV) Project Categories.....	5
EHV TRANSMISSION	7
<i>EHV Transmission Facilities Map</i>	8
<i>Local Existing and Planned EHV Transmission Facilities Map</i>	9
<i>Existing and Planned EHV Transmission Facilities Single-Line Diagram</i>	10
PLANNED 10-YEAR EHV PROJECTS	11
<i>Hassayampa – Pinal West 500kV Line Loop-in to Jojoba Switchyard</i>	12
<i>Pinal Central Substation to Tortolita Substation</i>	13
PLANNED 10-YEAR REACTIVE EHV PROJECTS	14
<i>Series Capacitor Replacement at Vail 345kV Substation (Springerville – Vail 345kV Line)</i>	15
<i>Series Capacitor Replacement at Vail 345kV Substation (Winchester – Vail 345kV Line)</i>	16
<i>Series Capacitor Replacement at Greenlee 345kV Substation (Springerville – Greenlee 345kV Line)</i>	17
CONCEPTUAL EHV PROJECTS	18
<i>Vail Substation to Irvington Substation</i>	19
<i>Irvington Substation to South Substation</i>	20
<i>Saguaro Substation to Winchester Substation</i>	21
<i>Vail Substation to South Substation – 2nd circuit</i>	22
<i>Springerville Substation to Greenlee Substation - 2nd circuit</i>	23
<i>Tortolita Substation to South Substation</i>	24
<i>Westwing Substation to South Substation – 2nd circuit</i>	25
138kV (HV) TRANSMISSION PROJECTS	26
<i>TEP Local Area 138kV Ten Year Transmission Plan</i>	27
PLANNED 138kV TRANSMISSION PROJECTS (HV)	28
<i>DeMoss Petrie Substation – Tucson Station 138 kV</i>	29
<i>Northeast - Rillito 138kV Line Reconductor</i>	30
<i>DeMoss Petrie – Northeast 138kV Line Reconductor</i>	31
<i>North Loop – Rillito 138kV Line Reconductor</i>	32
<i>DeMoss Petrie – North Loop 138kV Line Reconductor</i>	33
<i>North Loop Substation – West Ina Substation 138kV Line Reconductor</i>	34
<i>West Ina Substation – Del Cerro 138kV Line Reconductor</i>	35
<i>North Loop – Rancho Vistoso 138kV Line Reconductor</i>	36
<i>Irvington – 22nd Street 138kV Line Reconductor</i>	37
<i>Del Cerro– Tucson 138kV Line Reconductor</i>	38
<i>Tortolita Substation – Rancho Vistoso Substation Reconfiguration to Tortolita Substation – North Loop Substation #5 and North Loop Substation – Rancho Vistoso Substation</i>	39
<i>Future Toro Switchyard to Rosemont Substation 138 kV</i>	40
<i>Loop-in of existing La Canada – Rillito 138kV Transmission Line into future Orange Grove 138kV Substation</i>	41
<i>Irvington Substation –Tucson Station #2 138 kV</i>	42
<i>Vail Substation to East Loop Substation through Spanish Trail and Roberts Substations, looping-in the Roberts-East Loop line to the future Harrison Substation</i>	43
<i>Loop-in of future Toro – Green Valley 138kV transmission line into future Hartt 138kV substation</i>	45
<i>Loop-in of existing Northeast – Snyder 138kV Transmission Line into future Craycroft-Barril 138kV Substation</i>	46
<i>Interconnection of Tortolita – North Loop 138 kV with future TEP Marana 138 kV Substation</i>	47
<i>Interconnection of North Loop – Rancho Vistoso 138 kV line with future Naranja 138 kV Substation</i>	48

<i>Interconnection of existing Irvington – South Loop 138kV Transmission Line into future Corona 138kV Substation</i>	<i>49</i>
PLANNED 10-YEAR 138kV REACTIVE PROJECTS	50
<i>Rillito Substation 138kV Capacitor Bank #1 Upgrade.....</i>	<i>51</i>
<i>Canoa Ranch 138kV Capacitor Bank #1 Addition</i>	<i>52</i>
<i>North Loop Expansion Substation 138kV Capacitor Banks #1 and #2 Upgrade</i>	<i>53</i>
CONCEPTUAL 138kV PROJECTS (HV).....	54
<i>Irvington Substation to East Loop Substation (through 22nd Street Substation)</i>	<i>55</i>
EFFECTS OF DISTRIBUTED RENEWABLE GENERATION AND ENERGY EFFICIENCY PROGRAMS	56

INTRODUCTION

This 2015-2024 Ten-Year Plan is submitted by Tucson Electric Power Company ("TEP") pursuant to A.R.S. § 40-360.02. Included with this plan are transmission facilities planned for the Tucson Electric Power service territories.

This Ten-Year Plan has been prepared consistent with the expected in-service dates as projected in February 2014. Expected in-service dates shown may vary from future studies however, the dates shown represent the condition studied.

Previously reported planned projects that have been canceled are not included. Projects not expected to be built within the ten-year planning horizon with in-service dates shown as To Be Determined ("TBD") are considered "conceptual projects", distinguishing them from "planned projects" that are within the ten-year time frame. These conceptual projects may become planned projects as they move into the ten-year planning horizon in subsequent studies. Projects completed in the year prior to current year are designated as completed for tracking purposes.

This report includes system maps depicting the existing transmission networks and planned or conceptual projects followed by individual project descriptions. The maps and descriptions are intended to be general planning-level documents to explain projects conceptually. Therefore the maps and descriptions do not represent specific routes or geographically correct facility locations.

Load Forecasting

TEP's 2015 – 2024 Ten-Year Plan was developed based on TEP's approved Corporate Forecast. The ten-year demand forecast that was specifically developed for transmission planning was approved in February of 2014. This forecast takes into account distributed renewable generation ("DG") and energy efficiency ("EE") programs, as well as TEP's retail customer load.

Effects of Distributed Renewable Generation and Energy Efficiency Programs

In the 8th BTA (Decision 74785, October 29, 2012), the Arizona Corporation Commission ("Commission") ordered jurisdictional utilities to address the effects of distributed renewable generation and energy efficiency programs on future transmission needs in their ten-year plan filings. These effects are for the fifth year of the study only. Additional analysis was conducted to determine how the fifth year of the study would be affected by the absence of load reductions realized through DG and EE programs. There were no additional projects required when considering the loss of the effects of DG & EE. The analysis did not address the additional generation and distribution costs TEP may incur due to DG.

Planning the Extra High Voltage Transmission System

TEP has both 500kV and 345 kV on its Extra High Voltage ("EHV") system. TEP is a member of both the WestConnect Region and the Southwest Area Transmission ("SWAT") Sub-Regional Planning Group. TEP actively participates in various WestConnect committees and SWAT subcommittees to ensure that its EHV system is studied properly and any issues are addressed and planned for as they arise.

Extra High Voltage Transmission Project Categories

The EHV project summaries have been divided into categories that summarize the placement of each of the projects.

- Planned EHV Transmission Projects are those with planned in-service dates that fall within the ten-year planning window to support the TEP EHV system.
- Planned Reactive EHV Projects are projects that will provide voltage support for the TEP EHV system.
- Conceptual EHV Transmission Projects are composed of projects that either have a CEC in place or have been included within previous ten-year plans but are not scheduled in-service within the ten-year planning horizon and no in-service date has been determined.

See *Figures 1, 2 and 3* for maps depicting approximate routing and project locations for the EHV projects.

Planning the Local High Voltage (138kV) Transmission System

TEP conducts an annual review of its 138 kilovolt (“kV”) High Voltage (“HV”) Transmission System performance over a ten-year planning horizon. This results in identification of new facilities and upgrades to existing facilities, with associated in-service dates as needed to ensure adequate transmission capacity within TEP’s service territory as the Tucson metropolitan area continues to develop. Capital improvements are proposed for the TEP 138kV system to accommodate new 138/13.8kV, substations to address increased transmission facility loading, and to mitigate localized stability issues.

Power flow analysis is conducted to identify thermal overloads under normal and contingency conditions in compliance with the North American Electric Reliability Corporation (“NERC”) Reliability Standards and Western Electricity Coordinating Council (“WECC”) System Performance Criteria. Proposed projects are then determined such that the performance measures of the NERC Reliability Standards and WECC System Performance Criteria are met for Category A, B and C conditions.

High Voltage Project Categories

The High Voltage project summaries have been divided into categories that summarize the placement of the project.

- Planned 138kV Transmission Projects are those with planned in-service dates that fall within the ten-year planning window as needed to support the local TEP 138kV system. Projects that have been completed in the year prior to filing have been placed within this category for record keeping purposes.
- Planned 138kV Reactive Projects are projects that will provide voltage support for the local TEP 138kV system.
- Conceptual 138kV Projects are composed of projects that may have a CEC in place, have been included within previous ten-year plans, but are not scheduled in-service within the ten-year planning horizon and/or are part of a project that has been phased and portions of the phasing remain incomplete. No in-service date has been determined.

See *Figure 4* for a map depicting approximate routing and project locations for the above described projects

Extra High Voltage (EHV) Transmission

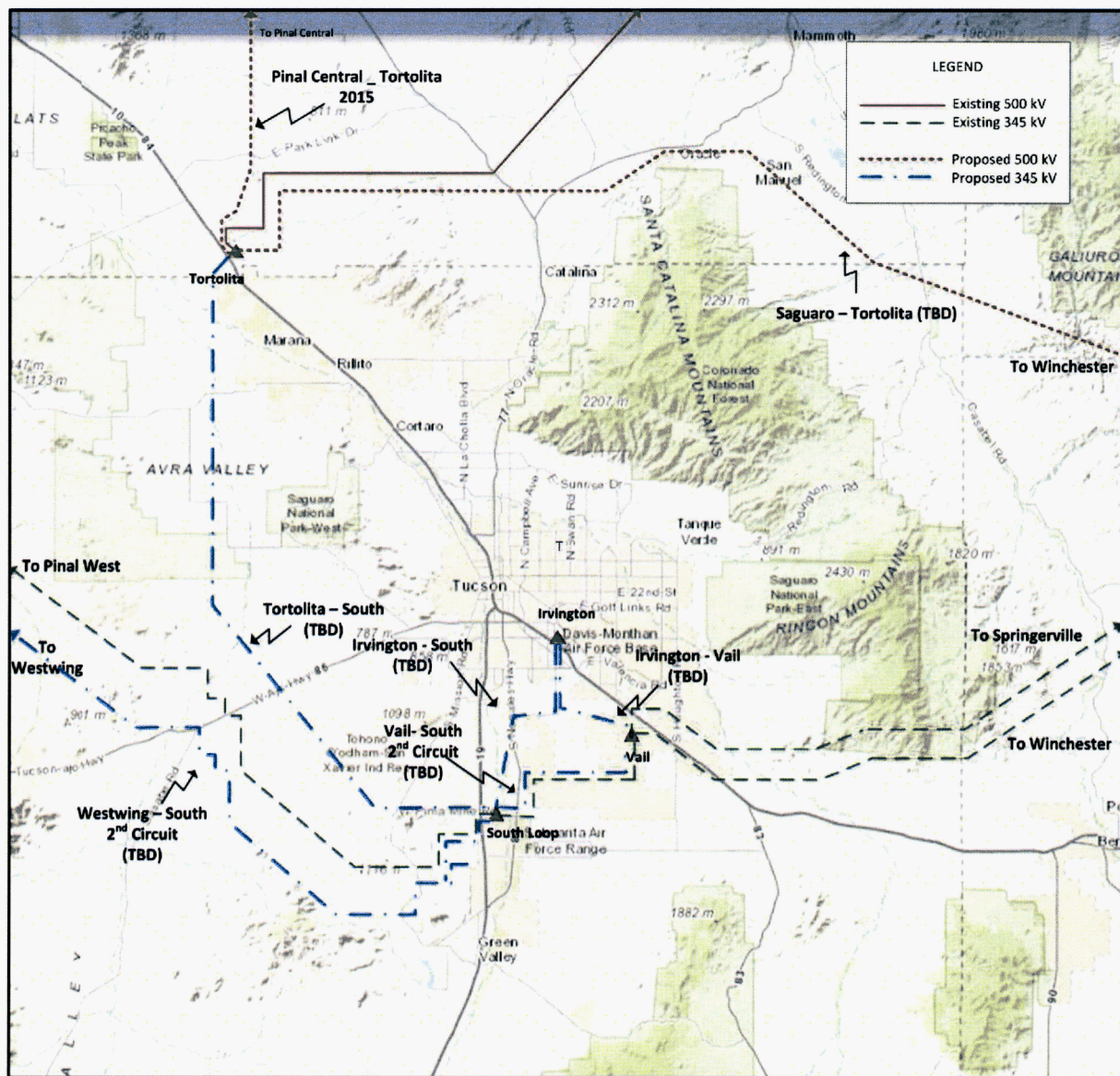


Figure 2. Local Existing and Planned EHV Transmission Facilities Map

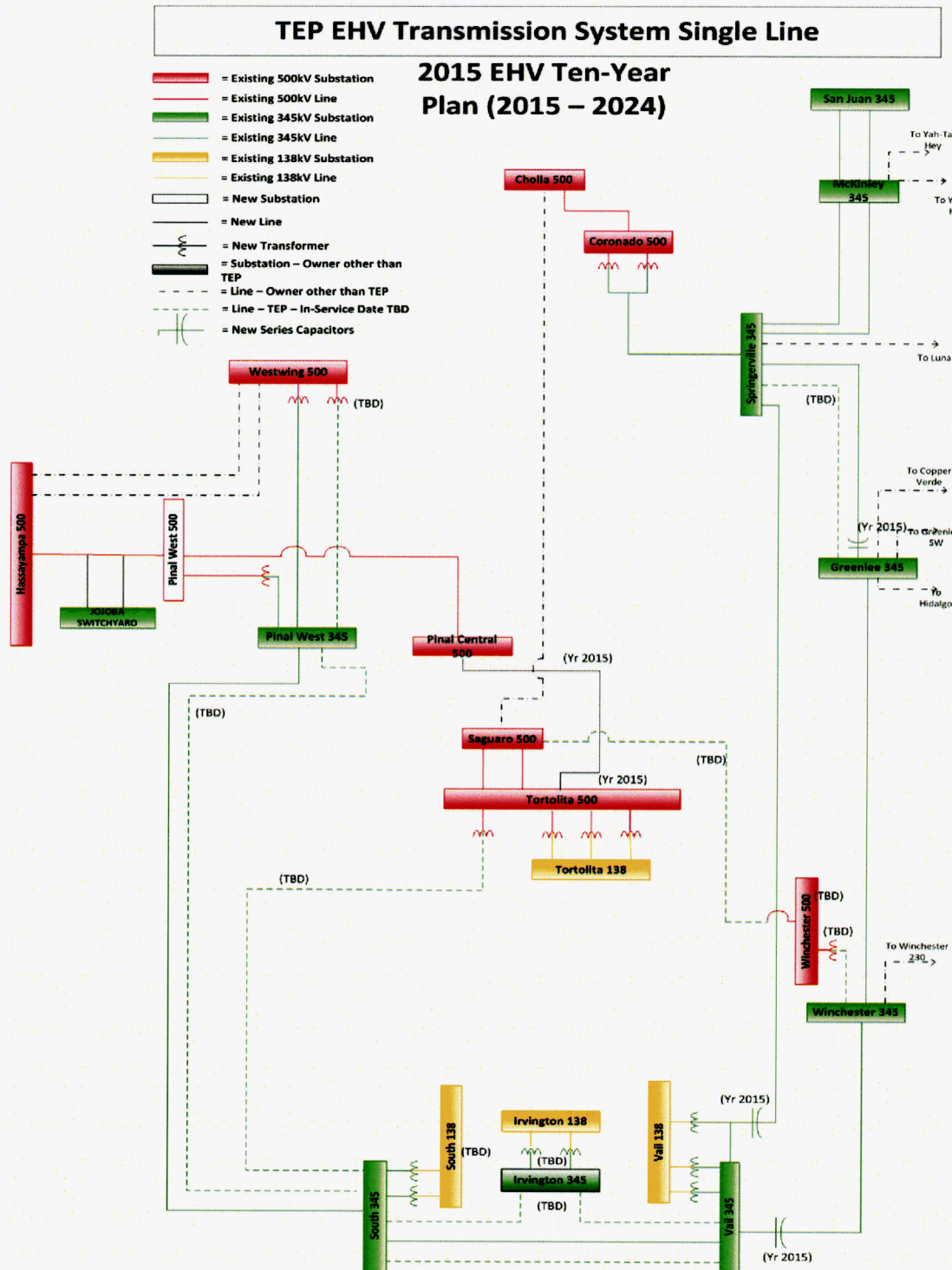


Figure 3. Existing and Planned EHV Transmission Facilities Single-Line Diagram

-
-

Planned EHV Transmission Projects

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Hassayampa – Pinal West 500kV Line Loop-in to Jojoba Switchyard
Parameters	
a) Voltage	500-kV
b) Capacity	System dependent
c) Point of Origin	Jojoba substation
d) Point of Termination	Interconnection with existing Hassayampa – Pinal West line
e) Length	Less than 3 spans
Routing	Drop existing line into existing switchyard
Purpose	To provide connectivity between existing 500kV transmission lines..
Date	
a) Construction Start	2015
b) In-Service Date	2016
Is Certificate Necessary	Certificate is part of Case # 124
Technical Studies	Interconnection studies are in progress

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Pinal Central Substation to Tortolita Substation
Parameters	
a) Voltage	500-kV
b) Capacity	System dependent
c) Point of Origin	Pinal Central substation (Sec. 30 T6S R8E)
d) Point of Termination	Tortolita Substation (Sec. 14 T10S R10E)
e) Length	Approximately 40 miles
Routing	In accordance with the CEC approved in Decision No. 73282 (July 30, 2012).
Purpose	To reinforce TEP's EHV system and to provide additional capacity for the flow of power from the Palo Verde area into TEP's northern service territory.
Date	
a) Construction Start	2014
b) In-Service Date	2015
Is Certificate Necessary	Certificate was part of Case # 165
Technical Studies	Completed

Planned Reactive EHV Projects

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Series Capacitor Replacement at Vail 345kV Substation (Springerville – Vail 345kV Line)
Parameters	
a) Voltage	345-kV
b) Capacity	1195 MW Continuous/1494 MW Emergency
c) Point of Origin	Vail Substation
d) Point of Termination	Vail Substation
e) Length	NA
Routing	NA
Purpose	To upgrade existing equipment.
Date	
a) Construction Start	2014
b) In-Service Date	2015
Is Certificate Necessary	No
Technical Studies	Completed

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Series Capacitor Replacement at Vail 345kV Substation (Winchester – Vail 345kV Line)
Parameters	
a) Voltage	345-kV
b) Capacity	1195 MW Continuous/1494 MW Emergency
c) Point of Origin	Vail Substation
d) Point of Termination	Vail Substation
e) Length	NA
Routing	NA
Purpose	To upgrade existing equipment.
Date	
a) Construction Start	2014
b) In-Service Date	2015
Is Certificate Necessary	No
Technical Studies	Completed

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Series Capacitor Replacement at Greenlee 345kV Substation (Springerville – Greenlee 345kV Line)
Parameters	
a) Voltage	345-kV
b) Capacity	1195 MW Continuous/1494 MW Emergency
c) Point of Origin	Greenlee Substation
d) Point of Termination	Greenlee Substation
e) Length	NA
Routing	NA
Purpose	To upgrade existing equipment.
Date	
a) Construction Start	2015
b) In-Service Date	2015
Is Certificate Necessary	No
Technical Studies	Completed

Conceptual EHV Transmission Projects

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Vail Substation to Irvington Substation
Parameters	
a) Voltage	345-kV
b) Capacity	System dependent
c) Point of Origin	Vail Substation (Sec. 4 T16S R15E)
d) Point of Termination	Irvington Substation (Sec. 03 T15S R14E)
e) Length	Approximately 11 miles
Routing	Unknown
Purpose	To reinforce TEP's EHV system and to provide a new tie between TEP's HV and EHV systems.
Date	
a) Construction Start	TBD
b) In-Service Date	TBD
Is Certificate Necessary	Yes
Technical Studies	Studies in progress via SWAT and internal TEP study efforts.

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Irvington Substation to South Substation
Parameters	
a) Voltage	345-kV
b) Capacity	System dependent
c) Point of Origin	Irvington Substation (Sec. 03 T15S R14E)
d) Point of Termination	South Substation (Sec. 36 T16S R13E)
e) Length	Approximately 16 miles
Routing	Unknown
Purpose	To reinforce TEP's EHV system and to provide a new tie between TEP's HV and EHV systems.
Date	
a) Construction Start	TBD
b) In-Service Date	TBD
Is Certificate Necessary	Yes
Technical Studies	Studies in progress via SWAT and internal TEP study efforts.

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Saguaro Substation to Winchester Substation
Parameters	
a) Voltage	500-kV
b) Capacity	System dependent
c) Point of Origin	Saguaro Substation
d) Point of Termination	Winchester Substation
e) Length	Approximately 80 miles
Routing	In accordance with the CEC approved in Decision 46801 (January 23, 1976).
Purpose	To reinforce TEP's EHV system and to provide additional capacity for the flow of power from the Palo Verde area into TEP's eastern transmission system.
Date	
a) Construction Start	TBD
b) In-Service Date	TBD
Is Certificate Necessary	Certificate is part of case # 23
Technical Studies	Studies in progress via SWAT and internal TEP study efforts.

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Vail Substation to South Substation – 2 nd circuit
Parameters	
a) Voltage	345-kV or 500-kV
b) Capacity	System dependent
c) Point of Origin	Vail Substation (Sec. 4 T16S R15E)
d) Point of Termination	South Substation (Sec. 36 T16S R13E)
e) Length	14 miles
Routing	Parallel and adjacent to existing Vail – South Line
Purpose	To reinforce TEP's EHV system and to provide additional transmission capacity between Vail and South Substations
Date	
a) Construction Start	TBD
b) In-Service Date	TBD
Is Certificate Necessary	Certificate is part of case # 15
Technical Studies	Studies conducted in coordination with neighboring utilities formed the basis for the design of TEP's original EHV system in the 1970's. This project is based on that original work. Detailed studies will be performed in the future upon a determination of need for this project by TEP

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Springerville Substation to Greenlee Substation - 2 nd circuit
Parameters	
a) Voltage	345-kV
b) Capacity	System dependent
c) Point of Origin	Springerville Substation (Sec. 34 T11N R30E)
d) Point of Termination	Greenlee Substation (Sec. 29 T5S R31E)
e) Length	110 Miles total; 27 Miles in Arizona.
Routing	Parallel and adjacent to existing Springerville to Greenlee line.
Purpose	To deliver power and energy from major TEP interconnections in the Four Corners and Eastern Arizona regions.
Date	
a) Construction Start	TBD
b) In-Service Date	TBD
Is Certificate Necessary	Certificate is part of case #'s 12, 30, 63 and 73
Technical Studies	Studies conducted in coordination with neighboring utilities formed the basis for the design of TEP's original EHV system in the 1970's. This project is based on that original work. Detailed studies will be performed in the future upon a determination of need for this project by TEP.

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Tortolita Substation to South Substation
Parameters	
a) Voltage	345-kV
b) Capacity	System dependent
c) Point of Origin	Tortolita Substation (Sec. 23 T10S R10E)
d) Point of Termination	South Substation (Sec. 36 T16S R13E)
e) Length	68 Miles
Routing	From Tortolita Substation south through Avra Valley to existing Westwing-South 345-kV transmission line right-of-way, then parallel and adjacent to existing Westwing -- South line to South Substation.
Purpose	To reinforce TEP's EHV system and to provide additional capacity for the flow of power in Southern Arizona.
Date	
a) Construction Start	TBD
b) In-Service Date	TBD
Is Certificate Necessary	Certificate is part of case # 50
Technical Studies	Studies conducted in coordination with neighboring utilities formed the basis for the design of TEP's original EHV system in the 70's. This project is based on that original work. Detailed studies will be performed in the future upon a determination of need for this project by TEP.

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Westwing Substation to South Substation – 2 nd circuit
Parameters	
a) Voltage	345-kV or 500-kV
b) Capacity	System dependent
c) Point of Origin	Westwing Substation (Sec. 12 T4N R1W)
d) Point of Termination	South Substation (Sec. 36 T16S R13E)
e) Length	178 Miles
Routing	Parallel and adjacent to existing Westwing to South line and will include loop-in to Pinal West.
Purpose	To deliver power and energy from major TEP interconnections in the Northwest Phoenix region.
Date	
a) Construction Start	TBD
b) In-Service Date	TBD
Is Certificate Necessary	Certificate is part of case # 15
Technical Studies	Studies conducted in coordination with neighboring utilities formed the basis for the design of TEP's original EHV system in the 1970's. This project is based on that original work. Detailed studies will be performed in the future upon a determination of need for this project by TEP.

-
-

High Voltage (138kV) Transmission Projects

2015 HV Ten Year Year Plan (2015 – 2024)

Legend:

- Existing Substation
- Existing EHV / HV Line
- New Substations
- New 138kV Line
- Reconductored 138kV Line
- New EHV Line

Map Annotations:

- 2017 Reconfigure: Tortolita-Rancho Vistoso (disconnect)
- Tortolita-North Loop (connect)
- North Loop-Rancho Vistoso (connect)
- Yr 2015, Yr 2018, Yr 2019, Yr 2020, Yr 2021, Yr 2022, Yr 2023, Yr 2024
- TBD (To Be Determined)
- Ft. Huachuca
- Rosemont

Figure 4. TEP Local Area 138kV Ten Year Transmission Plan

Planned 138kV Transmission Projects

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	DeMoss Petrie Substation – Tucson Station 138 kV
Parameters	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	DeMoss Petrie 138 kV Substation
d) Point of Termination	Tucson 138 kV Substation
e) Length	2.5 miles
Routing	South from DeMoss Petrie for approximately 1.25 miles, turn west for approximately 0.1 miles, turn south for approximately 0.5 miles, then east for approximately 0.4 miles, then northeast for approximately 0.2 miles. (Freeway Route)
Purpose	Required to meet reliability criteria of a localized voltage instability specific to loss of both the North Loop-West Ina and Irvington-Tucson 138 kV circuits.
Date	
a) Construction Start	Completed ¹ 2014
b) In-Service Date	August 28, 2014
Is Certificate Necessary	Certificate was part of case # 157
Technical Studies	Annual 138kV planning studies.

¹ This project will be removed in future Ten-Year Plans

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Northeast – Rillito 138kV Line Reconductor
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	Northeast Substation
d) Point of Termination	Rillito Substation
e) Length	Approximately 5 Miles
Routing	Existing
Purpose	Required to support TEP construction of new EHV Pinal Central to Tortolita 500kV line
Date	
a) Construction Start	Completed ²
b) In-Service Date	Completed 2014
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

² This project will be removed in future Ten-Year Plans

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	DeMoss Petrie – Northeast 138kV Line Reconductor
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	DeMoss Petrie Substation
d) Point of Termination	Northeast Substation
e) Length	Approximately 6 Miles
Routing	Existing
Purpose	Required to support TEP construction of new EHV Pinal Central to Tortolita 500kV line
Date	
a) Construction Start	2014
b) In-Service Date	2015
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	North Loop – Rillito 138kV Line Reconductor
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	North Loop Substation
d) Point of Termination	Rillito Substation
e) Length	Approximately 11 Miles
Routing	Existing
Purpose	Required to support TEP construction of new EHV Pinal Central to Tortolita 500kV line
Date	
a) Construction Start	2014
b) In-Service Date	2015
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	DeMoss Petrie – North Loop 138kV Line Reconductor
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	DeMoss Petrie Substation
d) Point of Termination	North Loop Substation
e) Length	Approximately 14 Miles
Routing	Existing
Purpose	Required to support TEP construction of new EHV Pinal Central to Tortolita 500kV line
Date	
a) Construction Start	2015
b) In-Service Date	2015
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	North Loop Substation – West Ina Substation 138kV Line Reconductor
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	North Loop Substation
d) Point of Termination	West Ina Substation
e) Length	Approximately 6 Miles
Routing	Existing
Purpose	Required to support TEP construction of new EHV Pinal Central to Tortolita 500kV line
Date	
a) Construction Start	2015
b) In-Service Date	2015
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	West Ina Substation – Del Cerro 138kV Line Reconductor
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	W. Ina Substation
d) Point of Termination	Del Cerro Substation
e) Length	Approximately 2.8 Miles
Routing	Existing
Purpose	To increase TEP load serving capability.
Date	
a) Construction Start	2015
b) In-Service Date	2015
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	North Loop – Rancho Vistoso 138kV Line Reconductor
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	North Loop Substation
d) Point of Termination	Rancho Vistoso Substation
e) Length	Approximately 10.5 Miles
Routing	Existing
Purpose	To increase TEP load serving capability.
Date	
a) Construction Start	2018
b) In-Service Date	2018
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Irvington – 22 nd Street 138kV Line Reconductor
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	Irvington Substation
d) Point of Termination	22 nd Street Substation
e) Length	Approximately 4 Miles
Routing	Existing
Purpose	To increase TEP load serving capability.
Date	
a) Construction Start	2020
b) In-Service Date	2020
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Del Cerro– Tucson 138kV Line Reconductor
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	Del Cerro Substation
d) Point of Termination	Tucson Substation
e) Length	Approximately 6.75 Miles
Routing	Existing
Purpose	To increase TEP load serving capability.
Date	
a) Construction Start	2023
b) In-Service Date	2023
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Tortolita Substation – Rancho Vistoso Substation Reconfiguration to Tortolita Substation – North Loop Substation #5 and North Loop Substation – Rancho Vistoso Substation
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	Tortolita Substation
d) Intermediate Point	North Loop Substation
e) Point of Termination	Rancho Vistoso Substation
f) Length	Approximately 22 Miles
Routing	Existing
Purpose	To increase TEP load serving capability.
Date	
a) Construction Start	2017
b) In-Service Date	2017
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Future Toro Switchyard to Rosemont Substation 138 kV Transmission line
Parameters	
a) Voltage	138-kV
b) Capacity	TBD
c) Point of Origin	Future Toro Switchyard that will be a loop-in of the TEP South – Green Valley 138 kV Line (Sec. 29 T17S R14E)
d) Point of Termination	Future Rosemont Switchyard (Sec. 30 T18S R16E)
e) Length	Approximately 13.2 Miles
Routing	Approximately 1 mile east from Toro, then southeast to the intersection of Santa Rita Road and Helvetia Road, then northeast to Rosemont.
Purpose	To provide electrical service to large mine load located east of Green Valley, AZ
Date	
a) Construction Start	On-Hold
b) In-Service Date	On-Hold (Dependent upon approval of Mine Record of Decision from United States Forest Service)
Is Certificate Necessary	Certificate is part of case # 164
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Loop-in of existing La Canada – Rillito 138kV Transmission Line into future Orange Grove 138kV Substation
Parameters	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	La Canada 138 kV Substation
d) Interim Point	Future Orange Grove 138 kV Substation
d) Point of Termination	Rillito 138kV Substation
e) Length	Loop-in off of existing line
Routing	Loop-in of the existing La Canada - Rillito 138kV circuit and drop into future station adjacent to the right-of-way
Purpose	Required to serve load from the future Orange Grove 138/13.8 kV Substation
Date	
a) Construction Start	2018
b) In-Service Date	2019
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Irvington Substation –Tucson Station #2 138 kV
Parameters	
a) Voltage	138-kV
b) Capacity	System Dependent
c) Point of Origin	Irvington Substation
d) Interim Point	Future Kino Substation
e) Point of Termination	Tucson Station
f) Length	Irvington – Kino – approximately 6 miles Kino – Tucson – approximately 5 miles
Routing	To be determined
Purpose	To increase load serving capability and reliability in Central Tucson.
Date	
a) Construction Start	2019
b) In-Service Date	2020
Is Certificate Necessary	Yes
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Vail Substation to East Loop Substation through Spanish Trail and Roberts Substations, looping-in the Roberts-East Loop line to the future Harrison Substation.
Parameters	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Vail Substation (Sec. 4 T16S R15E)
d) Point of Termination	East Loop Substation (Sec. 8 T14S R15E)
e) Length	Phase 1: Vail Substation to East Loop Substation - 22 Miles Phase 2: East Loop – Roberts – 7 miles Spanish Trail to Roberts – 5.75 miles Phase 3: Vail Substation to East Loop Substation - 22 Miles Phase 4: East Loop – future Harrison – approximately 3 miles Roberts – future Harrison – approximately 4 miles
Routing	East and north from Vail Substation along existing transmission line to Irvington and Houghton Roads, then north along Houghton Road to Speedway Boulevard, then east and north to Roberts Substation and west along Speedway to East Loop Substation.
Purpose	To provide additional electric service to the eastern portion of TEP's service area and to reinforce the local transmission system.

Date

a) Construction Start

1976

b) In-Service Date

Phase 1 - 1977
(Completed)

Spanish Trail
Substation to East Loop
and Vail Substation

Phase 2 - 1983
(Completed)

Roberts Substation
and associated 138-kV
lines

Phase 3 –
TBD

Third 138-kV line from
Vail to East Loop
Substation

Phase 4 - 2020

Loop-in of the existing
Roberts – East Loop
138kV circuit and drop
into future Harrison
station adjacent to the
right-of-way

Is Certificate Necessary

Certificate is part of case # 8.

Technical Studies

Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Loop-in of future Toro – Green Valley 138kV transmission line into future Hartt 138kV substation
Parameters	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Future Toro 138 kV Substation
d) Interim Point	Future Hartt 138 kV Substation
d) Point of Termination	Green Valley 138kV Substation
e) Length	Loop-in off of existing line
Routing	Looping the existing South – Future Toro – Green Valley 138kV circuit and drop into future station adjacent to the right-of-way
Purpose	Increase load serving capability and reliability.
Date	
a) Construction Start	2020
b) In-Service Date	2021
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Loop-in of existing Northeast – Snyder 138kV Transmission Line into future Craycroft-Barril 138kV Substation
Parameters	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Northeast 138 kV Substation
d) Interim Point	Future Craycroft-Barril 138 kV Substation
d) Point of Termination	Snyder 138kV Substation
e) Length	Loop-in of existing line
Routing	Existing Northeast-Snyder Corridor. Requires 1 span of wire to drop into station.
Purpose	Required to serve load at the new Craycroft-Barril 138/13.8 kV Substation
Date	
a) Construction Start	2020
b) In-Service Date	2021
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Interconnection of Tortolita – North Loop 138 kV line with future TEP Marana 138 kV Substation
Parameters	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Tortolita 138 kV Substation
d) Interim Point	Future Marana 138kV Substation
e) Point of Termination	North Loop 138 kV Substation
f) Length	Approximately 4 miles from existing circuit
Routing	Loop-in a circuit from the Tortolita- North Loop corridor (line 125) at the Trico-Marana Rd. alignment and extend approximately 4 miles of double-circuit pole-line west across I-10 to proposed Marana substation site near Sanders Rd.
Purpose	Required to serve load at the new Marana 138/13.8 kV Substation located approximately 9 miles south-southeast of the Tortolita Substation
Date	
a) Construction Start	2021
b) In-Service Date	2022
Is Certificate Necessary	Yes
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Interconnection of North Loop – Rancho Vistoso 138 kV line with future Naranja 138 kV Substation
Parameters	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	North Loop 138 kV Substation
d) Interim Point	Future Naranja 138kV Substation
e) Point of Termination	Rancho Vistoso 138 kV Substation
f) Length	Approximately 1mile from existing circuit
Routing	Loop-in a circuit from the North Loop – Rancho Vistoso corridor alignment and extend approximately 1 mile of double-circuit pole-line south to future Naranja substation site.
Purpose	Required to serve load at the future Naranja 138/13.8 kV Substation
Date	
a) Construction Start	2022
b) In-Service Date	2023
Is Certificate Necessary	Yes
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Interconnection of existing Irvington – South Loop 138kV Transmission Line into future Corona 138kV Substation
Parameters	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Irvington 138 kV Substation
d) Interim Point	Future Corona 138kV Substation
e) Point of Termination	South Loop 138 kV Substation
f) Length	Approximately 1 mile from existing circuit
Routing	Existing Irvington – South Loop Corridor. Requires 1 span of wire to drop into station.
Purpose	Required to serve load at the new Corona 138/13.8 kV Substation
Date	
a) Construction Start	2023
b) In-Service Date	2024
Is Certificate Necessary	Yes
Technical Studies	Annual 138kV planning studies

Planned 138kV Reactive Projects

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Rillito Substation 138kV Capacitor Bank #1 Upgrade
Parameters	
a) Voltage	138-kV
b) Capacity	Exist: 36.7 MVAR, Proposed Total: 48.9 MVAR at 138kV
c) Point of Origin	Rillito Substation
d) Point of Termination	Rillito Substation
e) Length	NA
Routing	NA
Purpose	Voltage support of the TEP 138kV system.
Date	
a) Construction Start	Completed ³
b) In-Service Date	Completed, 2014
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

³ To be removed from future Ten-Year Plans

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Canoa Ranch 138kV Capacitor Bank #1 Addition
Parameters	
a) Voltage	138-kV
b) Capacity	24.4 MVAR at 138kV
c) Point of Origin	Canoa Ranch Substation
d) Point of Termination	Canoa Ranch Substation
e) Length	NA
Routing	NA
Purpose	Voltage support of the TEP 138kV system.
Date	
a) Construction Start	2016
b) In-Service Date	2016
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	North Loop Substation 138kV Capacitor Banks #1 and #2 Upgrade
Parameters	
a) Voltage	138-kV
b) Capacity	Exist: 36.7 MVAR, each Proposed Total: 48.9 MVAR each at 138kV
c) Point of Origin	North Loop Substation
d) Point of Termination	North Loop Substation
e) Length	NA
Routing	NA
Purpose	Voltage support of the TEP 138kV system.
Date	
a) Construction Start	2016
b) In-Service Date	2016
Is Certificate Necessary	No
Technical Studies	Annual 138kV planning studies

Conceptual 138kV Transmission Projects

TUCSON ELECTRIC POWER COMPANY
10 YEAR PLAN
TRANSMISSION FACILITIES

Project Designation	Irvington Substation to East Loop Substation (through 22nd Street Substation)	
Parameters		
a) Voltage	138-kV	
b) Capacity	System dependent	
c) Point of Origin	Irvington Substation (Sec. 03 T15S R14E)	
d) Point of Termination	East Loop Substation (Sec. 08 T14S R15E)	
e) Length	Irvington – East Loop – 9 Miles	
	Phase 1: Irvington Substation to 22 nd Street Substation – 4 miles	
	Phase 2: 22 nd Street to East Loop Substation – 5 miles	
Routing	North and East of Irvington Substation, through 22nd Street Substation, then East and North to East Loop Substation.	
Purpose	To provide additional electric service to the central area of TEP's service area and to reinforce the local transmission system.	
Date		
a) Construction Start	1985	
b) In-Service Date	Phase 1 – 1994 (Completed)	Irvington Station to 22nd St. Substation
	Phase 2 – 2000 (Completed)	22nd Street to East Loop Substation
	Phase 3 – TBD	2nd Circuit of Phase I
Is Certificate Necessary	Certificate is part of case # 66.	

Effects of Distributed Renewable Generation and Energy Efficiency Programs

All projects included in the plan would be required with or without the effects of DG and EE programs. The impact of DG and EE programs did not result in a delay or cancellation of any projects required for the 2019 study year, nor were any additional projects required if the effects of DG and EE are not considered.